Sub A7

We claim:

1. A system for transferring information in a computer network from a server to a client computer, the information including a plurality of hierarchically related objects, wherein a viewable subset of the objects is displayed on a display device connected to the client computer in the form of a navigable tree having expandable nodes, the viewable subset being visible in a navigation pane on the display device, the system comprising:

a tree descriptor array comprising information describing each of the objects to be displayed in the navigation pane; and

a tree descriptor string comprising information describing a hierarchical structure of expanded nodes in the tree;

wherein the tree descriptor array and the tree descriptor string are sent from the server to the client computer; and

wherein the tree descriptor string comprises a list of only those said nodes which are to be expanded and displayed on the display device.

2. The system of claim 1, further including:

a managed object list comprising an entry for each of a plurality of managed objects in the navigable tree; and

a view list comprising a plurality of indicia of object data records, each of which represents a child of one of the managed objects corresponding to an entry in the managed object list;

wherein each said entry in the managed object list comprises indicia of an entry in the view list.

3. The system of claim 2, wherein each one of the object data records include information comprising:

a Universal Identifier for the object to which a given said one of the object data records corresponds; and

a Universal Identifier for the parent of the object to which a given said one of the object data records corresponds.

4. The system of claim 1, wherein the tree descriptor array comprises information for each object in the subset of the objects to be displayed, including:

a Universal Identifier of the object;

a first index indicating the relative position of the object in the navigable tree, at which a tree segment starts; and

a second index indicating the relative tree position of the object from its managed object.

5. The system of claim 4, wherein the tree descriptor array further comprises:

a first string indicating whether the object is expandable; and

a second string indicating whether the object is presently expanded.

6. The system of claim 1, wherein the tree descriptor string further comprises a representation of the hierarchical structure of open containers in the part of the tree that is being displayed.

7. The system of claim 6, wherein the tree descriptor string further comprises indicia of the location of a cursor on the display device.

8. The system of claim 7, wherein the tree descriptor string further comprises indicia of the state of nodes in the displayed segment of the navigation tree including whether a node comprising a folder is open.

9. The system of claim 1, wherein the client computer uses information in the tree descriptor string to render a view that includes one expanded said nodes.

10. The system of claim 9, wherein the client computer also uses information in the tree descriptor array to render a view that includes said nodes which are to be expanded.

11. The system of claim 1, wherein, in response to a user of the client computer clicking on one of said expandable nodes, the client computer sends information via the tree descriptor string to the server identifying the node to be expanded.

12. The system of claim 1, wherein the list contained in the tree descriptor string contains a list of those said nodes which are to be expanded and displayed on the display device.

13. A system for transferring information in a computer network from a server to a client computer, the information including a plurality of hierarchically related objects, wherein a viewable subset of the objects is displayed on a display device connected to the client computer in the form of a navigable tree having expandable nodes represented by container objects, the viewable subset being visible in a navigation pane on the display device, the system comprising:

a tree descriptor array comprising information describing each of the objects to be displayed in the navigation pane; and

a tree descriptor string comprising information describing a hierarchical structure of said container objects that are open;

wherein the tree descriptor array and the tree descriptor string are sent from the server to the client computer; and

wherein the tree descriptor string contains a list of only those said container objects which have been opened.

14. The system of claim 13, further including:

a managed object list comprising an entry for each of a plurality of managed objects in the navigable tree; and

a view list comprising a plurality of indicia of object data records, each of which represents a child of one of the managed objects corresponding to an entry in the managed object list;

wherein each said entry in the managed object list comprises indicia of an entry in the view list.

15. The system of claim 14, wherein each one of the object data records include information comprising:

a Universal Identifier for the object to which a given said one of the object data records corresponds; and

a Universal Identifier for the parent of the object to which a given said one of the object data records corresponds.

16. The system of claim 13, wherein the tree descriptor array comprises information for each object in the subset of the objects to be displayed, including:

a Universal Identifier of the object;

a first index indicating the relative position of the object in the navigable tree, at which a tree segment starts; and

a second index indicating the relative tree position of the object from its managed object.

17. The system of claim 16, wherein the tree descriptor array further comprises:

a first string indicating whether the object is expandable; and

a second string indicating whether the object is presently expanded.

18. The system of claim 13, wherein the tree descriptor string further comprises a representation of the hierarchical structure of open containers in the part of the tree that is being displayed.

19. The system of claim 18, wherein the tree descriptor string further comprises indicia of the location of a cursor on the display device.

20. A method for transferring information in a computer network from a server to a client computer, the information including a plurality of hierarchically related objects, wherein a viewable subset of the objects is displayed on a display device connected to the client computer in the form of a navigable tree having expandable nodes, the viewable subset being visible in a navigation pane on the display device, the method comprising the steps of:

sending, from the client computer to the server, tree descriptor information describing a hierarchical structure of the nodes that are to be expanded;

determining a tree segment to be displayed in the navigation pane in response to the tree descriptor information received from the client computer; and

sending, from the server to the client computer, a list of each of the objects in the tree segment to be displayed, and information describing each of the objects to be displayed;

wherein said tree descriptor information comprises a list of only the nodes that are to be expanded.

21. The method of claim 20, wherein said information describing each of the objects to be displayed comprises information including:

a Universal Identifier of the object;

a first index indicating the relative position of the object in the navigable tree, at which a tree segment starts; and

a second index indicating the relative tree position of the object from its managed object.

22. The system of claim 21, wherein said information describing each of the objects to be displayed further comprises:

a first string indicating whether the object is expandable; and

a second string indicating whether the object is presently expanded.

23. The system of claim 20, wherein the tree descriptor information further comprises a representation of the hierarchical structure of open containers in the part of the tree that is being displayed.

24. The system of claim 23, wherein the tree descriptor information further comprises indicia of the location of a cursor on the display device.

25. The system of claim 24, wherein the tree descriptor information further comprises indicia of the state of nodes in the displayed segment of the navigation tree including whether a node comprising a folder is open.

26. The method of claim 20, further comprising the step of initially sending, in response to a user of the client computer clicking on one of said expandable nodes, information identifying the node to be expanded.

27. A method for transferring information in a computer network from a server to a client computer, the information including a plurality of hierarchically related objects, wherein a viewable subset of the objects is displayed on a display device connected to the client computer in the form of a navigable tree having expandable nodes, the viewable subset being visible in a navigation pane on the display device, the method comprising the steps of:

generating a tree descriptor array comprising information describing each of the objects to be displayed in the navigation pane;

generating a tree descriptor string comprising information describing a hierarchical structure of expanded nodes in the tree; and

sending the tree descriptor array and the tree descriptor string from the server to the client computer;

wherein the tree descriptor string comprises a list of only those said nodes which are to be expanded and displayed on the display device.